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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/857,348	07/24/2001	Fredrik Persson	66477-012-5	3135

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EXAMINER

MACARTHUR, VICTOR L

ART UNIT	PAPER NUMBER
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3679

DATE MAILED: 12/02/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/857,348	PERSSON ET AL.	
	Examiner	Art Unit	
	Victor MacArthur	3679	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 07 September 2004 and 16 September 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-3,5,7,8 and 12-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-3,5,7,8 and 12-20 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☒ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|--|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input checked="" type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Priority

Acknowledgment is made of applicant's claim for foreign priority based on an application filed in Sweden on 12/03/1998. It is noted, however, that a copy of a certified copy of the priority document has not been received.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-3, 5, 8 and 12-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Clavel U.S. Patent 4976582 in view of Latzen U.S. Patent 2733085.

Claim 1. Clavel discloses (fig.2) an industrial robot including at least one linkage device (5) in which pull rods (5a, 5b) are arranged in a multi-joint system where the joints include three-axle ball and socket joints (26a, 26b, 27a, 27b as described in col.3, ll.43-45). Clavel does not expressly disclose how the ball is supported and retained in the socket thus implying that the particular construction of the ball and socket joints is not critical to the performance of the robot and that any type of ball and socket joint could be used. Latzen teaches (fig.1) supporting and retaining a ball (1) within a socket (2) by having a bearing element (7) fixed so that the bearing element does not rotate in a housing (portion of 2 receiving 7) in the socket of a joint, the housing including a surface (surface of 2 contacting 15) against which the bearing element abuts

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and the surface being provided with friction-increasing means (grooves in 2 receiving 15) in the form of grooves engageable with the bearing element to increase friction between the surface and the bearing element, the grooves in the housing surface being arranged parallel with a central axis of the housing, the grooves engaging the bearing element and thereby prevent rotation of the bearing element in the housing, the grooves facilitating installation (by being parallel to the installation direction) of the bearing element in the housing, and the grooves further facilitating removal (by being parallel to the removal direction) from and replacement of the bearing element within the housing. Latzen states (col.2, ll.10-14) that supporting a ball in a socket in this manner compensates for any eccentricity and ensures a good seat. Latzen further states that such support can be applied to ball and socket joint for any and all purposes. Therefore, it would have been obvious to one with ordinary skill in the art at the time the invention was made to support the Clavel ball as taught by Latzen, for the purpose of compensating for any eccentricity and ensuring a good seat. Regarding the limitation "to deform the bearing element" in line 10 of claim 1, it appears that the applicant's fully assembled robot joint does not incur any deformation in the bearing element after assembly and that it is only during assembly when the bearing is inserted into the housing that the bearing incurs deformation. As such, this limitation describes a method of forming. Since claim 1 is a product claim the specific method of forming is not germane to the issue of patentability of the device itself. Therefore, the limitation "to deform the bearing element" has been given only limited patentable weight. See MPEP § 2113.

Furthermore, note that the Latzen bearing grooves are plastically deformed in as much as the applicant's bearing grooves are, even though the Latzen grooves are formed by knurling rather than pressing into a pre-grooved housing.

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Claim 2. Latzen teaches that the bearing element comprises an annular bearing element.

Claim 3. Latzen teaches that the friction-increasing means is structured as to penetrate (as seen in fig.1) the bearing element effecting a permanent deformation.

Claim 5. Latzen teaches that the bearing element abuts with the surface and is pressed there against to fit tightly.

Claim 8. Clavel discloses a robot that appears to be a delta robot. Furthermore, the applicant clearly states that the prior art to Clavel comprises a delta robot, as is stated in lines 17-19 of page 1 of the applicant's specification.

Regarding claims 12-14 and 16, Clavel as modified by Latzen in the rejection to claim 1 above discloses all of the method steps required to make the joint of claims 12-14 and 16 with the exception of the method step of "the grooves [of the housing] engaging the bearing element to deform the bearing element". Rather Latzen teaches the opposite: grooves on the bearing element engaging the housing to deform the housing. However, the reversal of components in a prior art reference is a design consideration within the skill of the art. In re Gazda, 219 F.2d 449, 104 USPQ 400 (CCPA 1955); In re Japikse, 181 F.2d 1019, 86 USPQ 70 (CCPA 1950). Therefore, it would have been obvious to reverse the positioning such that grooves are located in the housing such that they engage the bearing element to deform the bearing element; as such practice is a design consideration within the skill of the art.

Claim 15. Latzen teaches that the bearing element further includes friction-increasing means (15 as seen in fig.1) in the form of grooves (grooves within 15) arranged parallel with a central axis of the bearing element, the grooves on the surface of the housing being engageable

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with the grooves provided on the bearing element to increase friction between the surface and the bearing element.

Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Clavel U.S. Patent 4976582 in view of Latzen U.S. Patent 2733085, as applied to claim 1 above, and further in view of Matsuoka U.S. Patent 4430016.

Claim 7. Latzen does not expressly state what material the bearing element is made of. Matsuoka teaches (figs 1 and 3) that it is beneficial to make bearings (4) from a polymer material for the purpose of improving lubrication (col.3, ll.13-17). Therefore, it would have been obvious to make the bearing from a polymer material, as taught by Matsuoka, for the purpose of improving lubrication.

Claims 17-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Clavel U.S. Patent 4976582 in view of Latzen (U.S. Patent 2733085) and Rosheim (U.S. Patent 5,845,540).

Claim 17. Clavel as modified by Latzen in the rejection of claim 1 above suggests all of the claim 17 limitations that are present in claim 1. Neither Clavel nor Latzen expressly state how the socket of a robot ball and socket joint should be shaped. Rosheim teaches (fig.3) that sockets (39) of robot joints should be shaped as less than one-half of a sphere for the purpose of improving compactness (col.6, ll58-67). Therefore, it would have been obvious to one with ordinary skill in the art at the time the invention was made to further modify Clavel to have a socket shaped as less than one-half of a sphere, as taught by Rosheim, for the purpose of improving compactness. Furthermore, such modification would inherently facilitate rapid pivotal movement of the linkage relative to the socket, the one half of the sphere shape of the

socket further facilitating removal from and replacement of the bearing element within the housing by enabling rapid disconnection of the ball and socket joint, in as much as the applicant's invention does.

Claim 18. Latzen teaches that the friction-increasing means (grooves in 2 receiving 15) is structured in the form of grooves, which penetrate the bearing element. The limitation "effecting a permanent deformation" describes action only occurring during the forming of the applicant's robot joint and does not limit the finally produced joint structure. Since claim 18 is a product claim the specific method of forming is not germane to the issue of patentability of the device itself. Therefore, this limitation has been given only limited patentable weight. See MPEP § 2113.

Claim 19. Clavel discloses that the robot comprises a delta robot (in as much as the applicant does).

Claim 20. Latzen teaches that the bearing element further includes friction-increasing means (15) in the form of grooves (grooves in 15) arranged parallel with a central axis of the bearing element, the grooves on the surface of the housing being engageable with the grooves provided on the bearing element to increase friction between the surface and the bearing element.

Response to Arguments

Applicant's arguments (submissions filed on 9/16/2004 and 9/7/2004) with regard to the newly added limitations are moot in view of the new grounds of rejection and reasons for allowance detailed above. The remaining arguments have been fully considered but they are not persuasive.

The applicants argue that it would not have been obvious to modify the Clavel ball joints to have bearings as taught by Latzen since the Latzen bearings could not be replaced as frequently and economically as the bearings of the applicant's invention. This is not persuasive. The question of whether or not replacement of the Latzen bearings is frequent or economical is irrelevant since the applicant's claims do not positively recite how frequently or economically the bearings are replaced. Nor are any specific bearing wear characteristics positively claimed.

The applicant argues that the Latzen grooves (within 15 and receiving 15) are not analogous to the applicant's grooves since they are formed by knurling rather than the method of forming used by the applicant. With regard to the product claims, this is not persuasive. The specific method of forming is not germane to the issue of patentability of the device itself. See MPEP § 2113.

The applicant argues that the Latzen grooves do not engage the bearing element to deform the bearing element. Again, as detailed in the rejections above, this limitation pertains to a method of forming and is not germane to the issue of patentability of the device itself. Applicant's finished joint does not incur deformation of the bearing element (in any manner not present in Latzen) but only does so during the forming of the joint.

The applicant argues that the Latzen lubricating grooves described in col.2 are for lubricating not for "engaging the bearing element". This is not persuasive. The examiner has not relied on lubricating grooves in the rejections above but rather the grooves in element (2) which engage the grooves of element (15) in element (7) as clearly shown in fig.1.

The applicant argues that the applicant's grooves are "not a mere inversion of [a] knurled rim" but instead prevents bearing rotation, facilitates bearing installation, removal and

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replacement. This is not persuasive. The claims recite no limitation positively forbidding grooves formed by knurling or by inversion of a knurled rim. Furthermore, the Latzen grooves perform all the positively claimed functions as detailed in the rejections above, within the broadest reasonable interpretation of the claim language.

The applicant argues that the prior art is not structurally combinable in that the joint structure of Latzen cannot be easily used with the robot structure of Clavel. This is not persuasive. The test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference; nor is it that the claimed invention must be expressly suggested in any one or all of the references. Rather, the test is what the combined teachings of the references would have suggested to those of ordinary skill in the art. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981).

Conclusion

Applicant's amendment (i.e. the newly added limitation "one-half of a sphere" in line 8 of claim 17) necessitated the new ground(s) of rejection presented in this Office action.

Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37

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CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Victor MacArthur whose telephone number is (703) 305-5701. The examiner can normally be reached on 8:30am - 5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Daniel P. Stodola can be reached on (703) 308-2686. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-1113.

VLM

VLM

November 29, 2004



JJ Swann
Supervisory Patent Examiner
Technology Center 3600